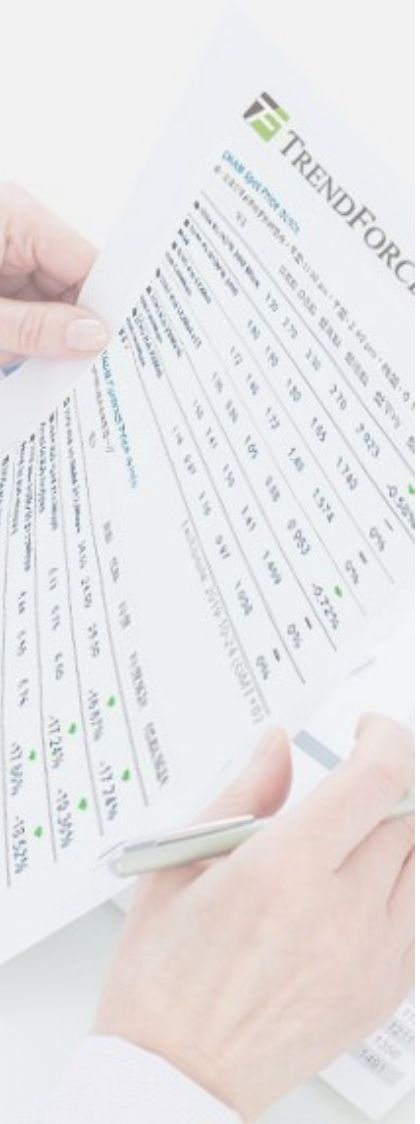
Global Energy Storage Market – Quarterly Market Demand Report (Sample)

2023

Green Energy Research /

TRENDFORCE 集邦咨询



CONTENT

Asia-Pacific

China / India / Japan / Australia

Analysis of Renewable Energy and Energy Storage Policies in the Asia-Pacific Region

TRENDFORCE

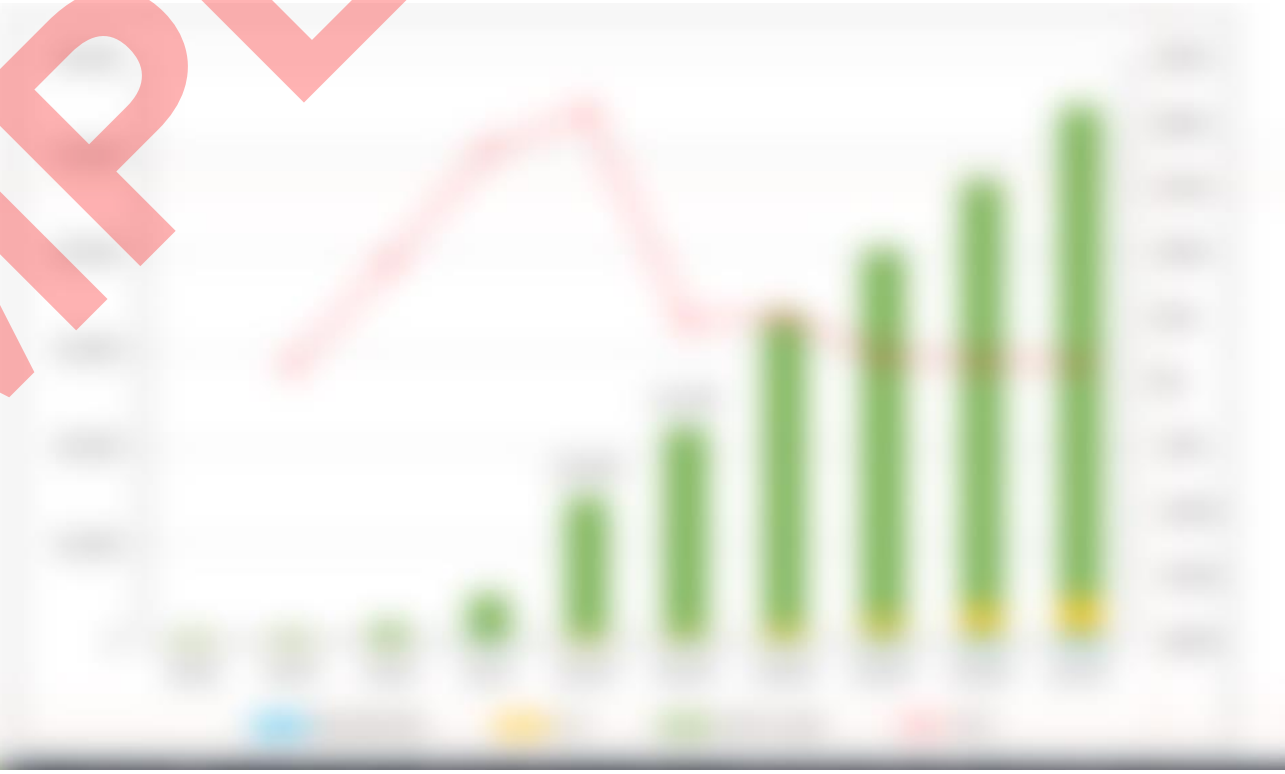
Country / Region	Renewable Energy Target	PV Target	Energy Storage Target	Policy	Note
China	Net Zero Emission (2060)	796 GW (2025)	64.85 GW (2025)	Energy Storage Requirements	Provinces have established requirements for the integration of energy storage in the development of renewable energy projects. These requirements relate to the discharge duration and the amount of energy storage capacity as a portion of the total generation capacity.
				Direct Subsidies	In several regions, subsidies are provided for energy storage projects. The calculation of the subsidy takes account of discharge amount, installed capacity, investment amount, etc. The maximum amount of subsidy ranges from RMB 300,000 to RMB 5 million.
				Project Tenders	The Chinese market for energy storage tenders experienced soaring growth in 2022, with the awarded capacity reaching 44GWh. Much of the tendered capacity was awarded in the second half of the year.
India	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Japan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Australia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

2-1 China’s Installed Capacity for New Energy Storage Projects Reached 6.9GW in 2022

- **As of2022Q3, China’s cumulative installed capacity for new energy storage projects reached 6.66 GW, reflecting a YoY growth of 78%.**
- The market for large-scale energy storage projects is poised for a new round of explosive growth in 2023, with the increase in installed capacity driven by projects that integrate PV or wind power with energy storage.

Figure: Projection on China’s Energy Storage Installations (Unit: MW)

Figure: Projection on China’s Energy Storage Installations (Unit: MWh)



2-1 China Has Ample Capacity for Accommodating Renewables as It Undertakes Orderly Transformation of Its Energy Structure

- In China, installed capacity is growing steadily for various energy sources. Renewable energy accounted for nearly 70% of the newly added power generation capacity in 2021, and solar PV had the largest increase in installed capacity.
- The growth of renewable energy generation is gaining pace, with wind power and solar PV taking the lead.

Figure: China's Installed Power Generation Capacity (Unit: GW)

Figure: China's Power Generation or Electricity Production (Unit: TWh)

2-1 Cumulative Installed Capacity of New Energy Storage Projects Will Reach 65GW

- Approximately 922GW of solar PV and wind power is expected to be added.

Figure: Cumulative Installed Capacity Target for New Energy Storage Projects

2-1 Development Plans for New Energy Storage Solutions Have Been Released, Targeting Generation, Transmission, and End-Users

- Development plans for new energy storage solutions have been announced, and they clearly outline the development of energy storage solutions that support generation, transmission, and end-users.
- Provinces have imposed mandatory energy storage requirements for renewable energy projects. These requirements relate to discharge duration and capacity portion. Presently, the average discharge duration is 2 hours and the average capacity portion is 10%

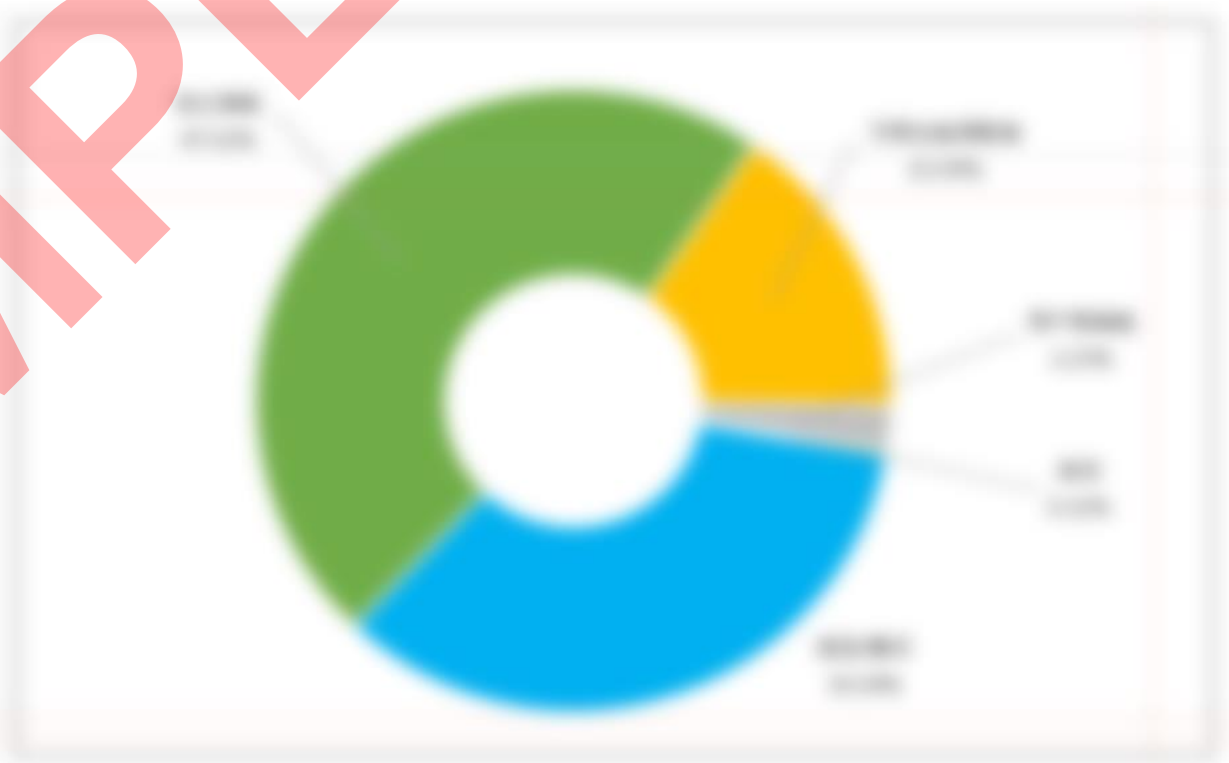
Figure: Discharge Duration and Capacity Portion for Energy Storage in China (Unit: Hour, %)

2-1 China Awarded 44GWh of Energy Storage via Project Tenders in 2022, and Locations of These Projects Concentrate in Xinjiang and Inner Mongolia

- China's market for energy storage tenders grew rapidly in 2022, and the amount awarded came to 44GWh.
- In terms of geographic distribution, the energy storage projects awarded through tenders are primarily located in Xinjiang, Inner Mongolia, Ningxia, Shanxi and Shandong. These projects all surpasses 2GWh in the amount of awarded capacity.

Figure: Energy Storage Capacity Awarded via Project Tenders in China (Unit: MW)

Figure: Distribution of Energy Storage Capacity Awarded via Project Tenders in China (Unit: MWh, %)



Europe

Germany / UK / Italy / Spain / Ireland

Analysis of Renewable Energy and Energy Storage Policies in Europe

Country / Region	Renewable Target	PV Target	Energy Storage Target	Policy	Note
Germany	80% (2030)	215GW (2030)	-	FIT	
				Kfw 270 Plan	
				State-Level Subsidies	
				“Network Booster”	
				“Innovation Tenders”	
Spain					
Ireland					
Italy					
UK					

3-1 Residential Energy Storage Grew by More Than 50% in Germany for 2022Q3 and Continues to Account for Much of That Country's Demand

- In Germany, the demand for residential energy storage solutions is being driven by the deployment of PV-plus-storage systems. The demand for residential energy storage solutions will continue to be the primary driver of installation growth in the future.

Figure: Monthly Energy Storage Installations in Germany (Unit: MW)

Figure: Projection on Energy Storage Installations in Germany (Unit: MW)

3-1 Germany’s Demand for Battery Energy Storage Is Expected to Register Annual Growth of More Than 8GWh Due to Strong Synergy Between PV and Energy Storage

- Germany’s energy storage market is expected to enter a high-growth period in 2025 as the demand there aligns with the growth of the country’s own PV installations.

Figure: Germany’s Plan for Installed Energy Storage Capacity (Unit: GWh)

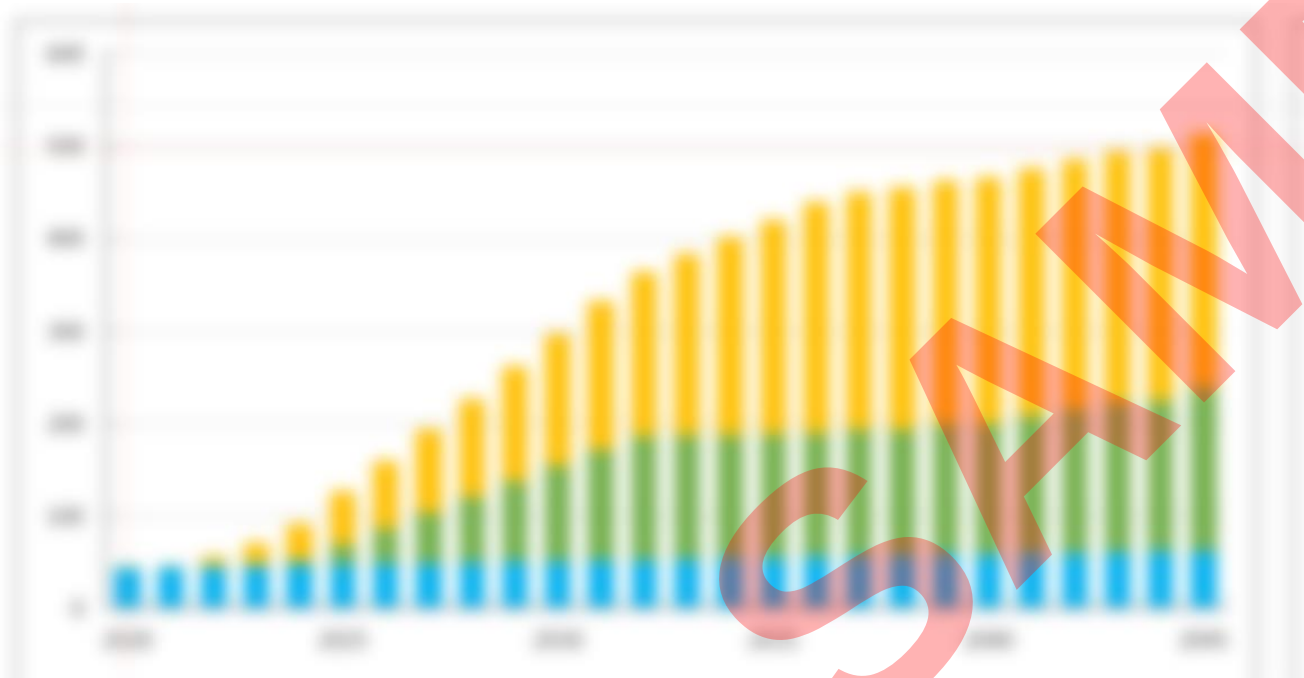


Figure: Germany’s Target for Installed Renewable Generation Capacity (Unit: GW)

3-1 National-Level Policies Are Being Scaled Back, but States Maintain Their Subsidies to Promote Energy Storage Projects

- Elimination of the revenue tax and VAT for residential PV systems spurs a significant increase in installations of PV-plus-storage systems.
- National-level policies for supporting energy storage projects are being scaled back. The available support is now limited to unsubsidized low-interest loans.
- Presently, the development of energy storage projects in Germany is primarily dependent on subsidy policies implemented by individual states. There are differences among states with respect to the amount of support and implementation efforts.

State	Initiation Date	Subsidy Plan	Content
North Rhine-Westphalia	2016.09	Renewable Energy and Energy Efficiency Plan	
Baden-Württemberg	2018.03	Grid-Friendly Photovoltaic Battery Storage Plan (I)	
	2021.03	Grid-Friendly Photovoltaic Battery Storage Plan (II)	
Brandenburg	2018.03	1,000 Energy Storage Incentives	
	2022.06	Small-Scale Energy Storage Plan	
Thuringia	2019.03	Solar Energy Investment Plan	
Bavaria	2019.08	PV and Energy Storage Plan	
Berlin	2019.10	Subsidy PV-Plus-Storage	

3-1 BYD Has Secured the Top Position in German Market for Residential PV-Plus-Storage Systems with a Market Share of 23%

- Germany is Europe’s largest market for residential PV-plus-storage systems. BYD, Sonnen, Senec, and E3/DC have consistently been leaders in this market.

Figure: Newly Added Energy Storage Capacity of Individual Germany States (Unit: MWh)

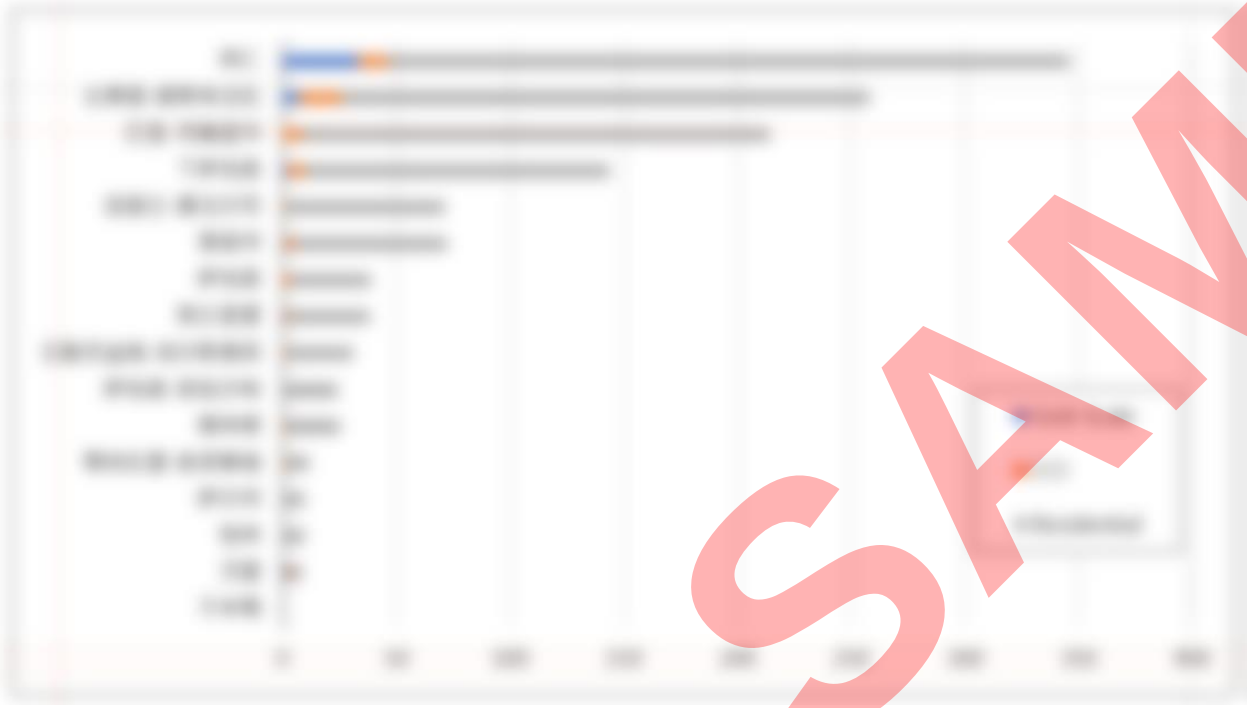
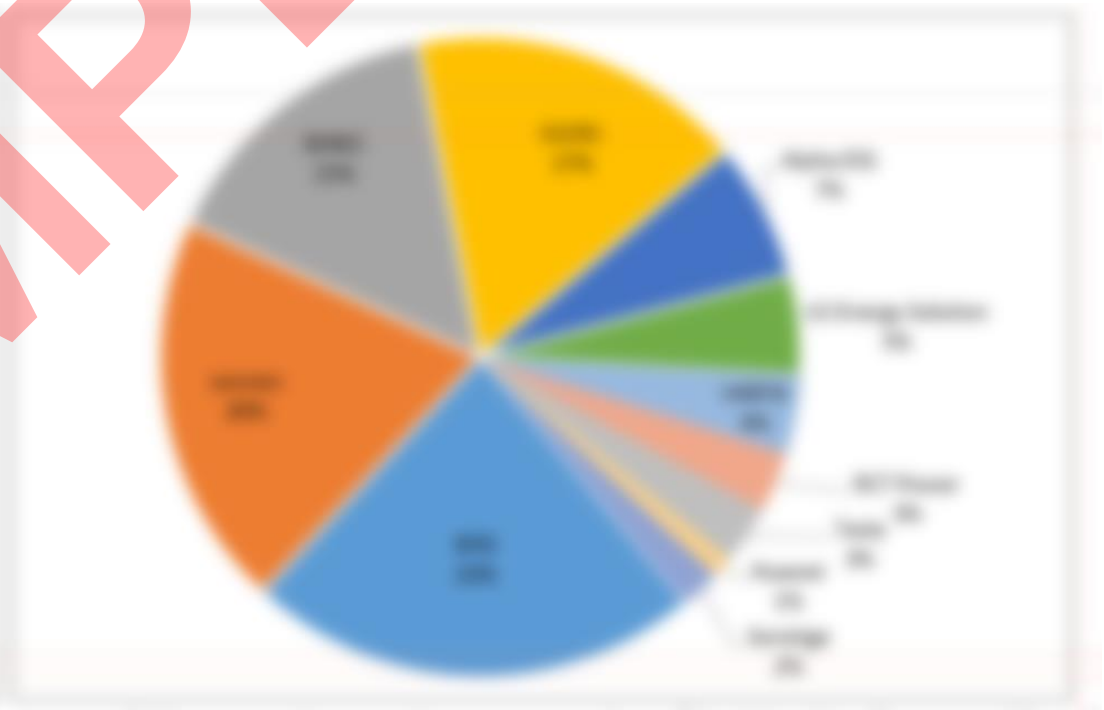


Figure: Distribution of German Market for Residential Energy Storage (Unit: %)

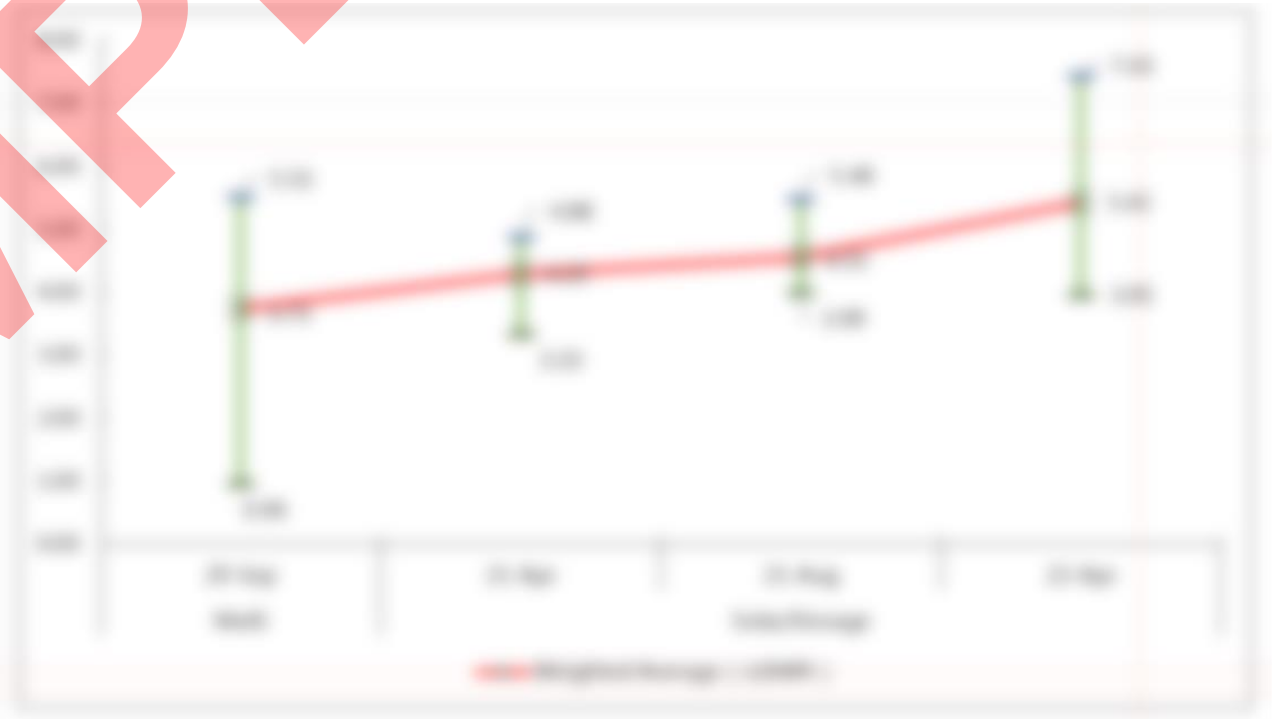


3-1 Germany Offers PV-Plus-Storage Projects with Significant Demand That Can Drive Large-Scale Installations

- Germany launches two tender rounds annually for energy storage, and the tendered capacity has increased over the years. The EEG 2023 is going to keep promoting projects that integrate energy storage with solar PV and wind power.
- The 250MW large-scale energy storage project in the “Network Booster”plan is expected to be completed by 2025, thereby reducing the need for new transmission lines and minimize interferences in grid operations.

Figure: Germany’s Energy Storage Tenders (Unit: MW)

Figure: Winning Bid Prices for Germany’s Energy Storage Tenders (Unit: ct/kWh)



America

USA / Canada / Brazil / Chile

Analysis on Policies in America

Country	RE Target	PV Target	Energy Storage	Policy	Note
USA	100% Carbon-Free Electricity (2035)	-	190GW (2050)	ITC	
				RPS	
				SGIP (California)	
				Net Metering Policy	
Canada					
Brazil					
Chile					
Mexico					

4-1 US Energy Storage Market Persisted in Accelerated Growth for First Three Quarters in 2022 amidst Robust Market Demand

- The US had accumulated 3.54GW/10.63GWh of energy storage installations for the first three quarters of 2022 at a YoY growth of 81.6%.

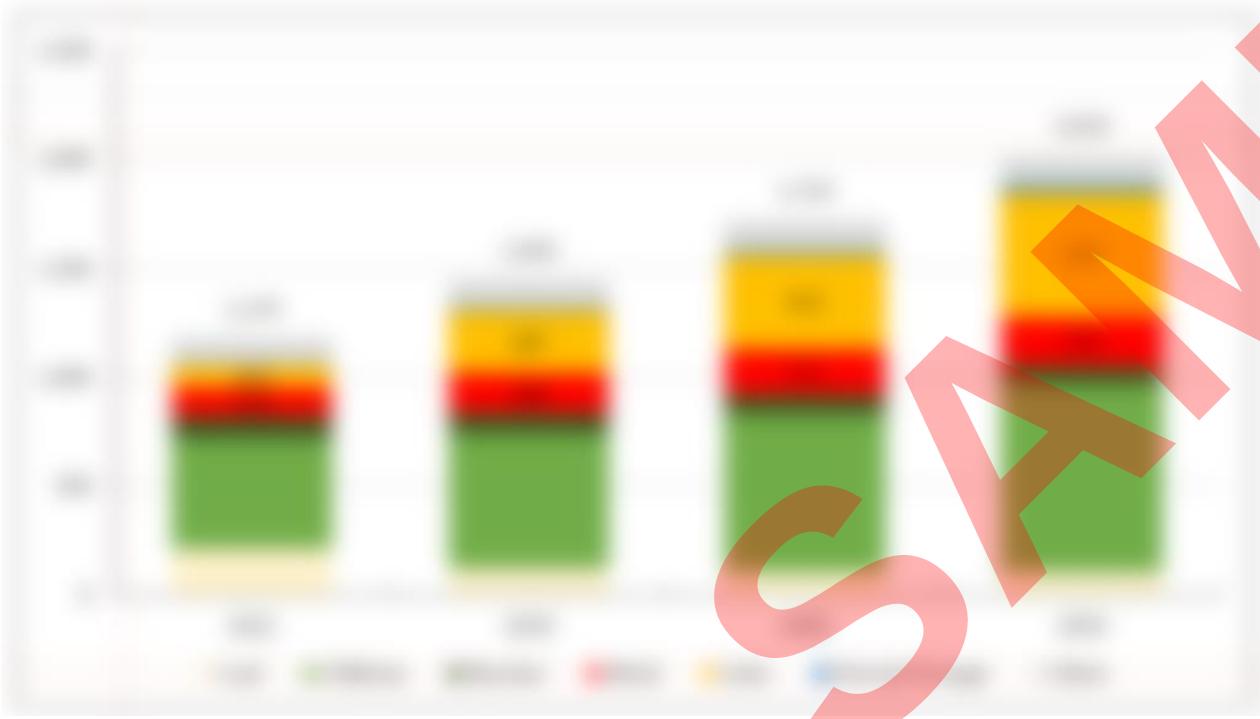
Quarterly Energy Storage Installations in the US (Unit: MW)

Projected Demand for Energy Storage Installations in the US (Unit: MW)

4-1 EIA Estimates the US to Accumulate 475GW of Wind-PV Installations in 2030 at 33%

- EIA estimates accumulated wind-PV installations to arrive at 475GW by 2030, which falls short to the target of 100% carbon-free electricity.
- The energy structure of the US consists 19.2% of renewable energy, and is still heavily dependent on traditional power generation methods such as natural gas and coal.

Anticipated Changes to the US Power Structure (Unit: GW)



Power Generation of Energy Sources in the US (Unit: TWh)

4-1 Demand for PV Storage Exceeds that of Other New Energy Reserves; Independent Energy Storage to also Support Corresponding Growth

- The effect of energy time shift for energy storage will become even more apparent among integrated PV projects in the future. Electrochemical energy storage in the US is expected to rely on two major factors for demand, which are independent energy storage and PV storage reserve, and has now entered an expeditious development period.

Outlook on Changes to Energy Storage Installations in the US (Unit: GW)

Changes to Energy Storage Installations in the US (Unit: GW)

*Above data on future energy storage installations in the US includes pumped storage hydroelectricity (22.9GW), which has no plans for new installations.

4-1 Mechanism Guarantees and Subsidies Provided by Policies to Actuate Local Upstream and Downstream Demand

The US federal government has been steadily refining related mechanisms for energy storage since 2008.

Energy storage projects in the US have passed multiple mechanism guarantees, and are achieving diversified profitability.

Policy	Date of Announcement	Name	Content
Mechanism Guarantee	2008	FERC Order 719	• Offers mechanism guarantees for energy storage when entering the wholesale electricity market.
	2011	FERC Order 745	• Power companies and retailers pay major clients to replace grid tariffs with utilization of energy storage.
	2013	FERC Order 784	• Proposes a settlement mechanism that allows grid operators to purchase auxiliary services from third-parties and offer auxiliary services of electricity and energy storage.
	2018	FERC Order 841	• Battery energy storage is regarded as an independent subject when participating in auxiliary electricity services and the whole electricity market, which removes the entry threshold of capacity for energy storage. • Entry threshold for energy storage is lowered from 1MW to 100kW.
	2020.09	FERC Order 2222	• RTO and ISO provide a financial mechanism for distributed energy sources. Distributed energy storage deployed on the user end can participate in the wholesale market.
Strategic Planning	2020.12	Roadmap of Energy Storage Grand Challenge	• Establishes and maintains the globally leading position of the US by 2030 regarding applications and exports of energy storage. Fulfills local energy storage market demand from local production, and constitutes a flexible, economical, and safe energy system.
Financial Mechanism/Fund Support	2019		
	2019		
	2021.03		
	2021.07		
	2021.11		
	2022.08		

4-1 ITC Incorporated for Independent Energy Storage for the First Time at a Maximum Exemption of 70%

- ITC has been prolonged with the official implementation of the Inflation Reduction Act (IRA), and independent energy storage is now included in the scope of ITC, which lowers the level of threshold and elevates economic efficiency of energy storage that will significantly affect the demand of the US energy storage market.

Exemption of ITC after Implementation of IRA

Condition		Basic Exemption	Additional Exemption	Exemption Ratio
Residential	PV + storage or independent energy storage (>3kWh)	30%	N/A	30%

Condition			Basic Exemption	Additional Exemption			Exemption Ratio
				Local Production	Energy Communities	Low-Income Communities or Indian Reserves / Low-Income Residential Buildings (Below 5MW)	
Industrial & Commercial and Large Energy Storage	<1MW		30%	10%	10%	10%/20%	30%-70%
	>1MW	Fulfill specific labor requirements / construction begins within 60 days	(6%+24%) /30%				
		————	6%	2%	2%		6%-30%

Specific labor conditions: Under the premise of fulfilling existing salaries, 10% of total construction time for projects must be completed by qualified apprentices. The ratio will climb to 12.5% in 2023.
Local production: Projects must utilize 100% US-made steels, and fulfill the requirement of utilizing 40% raw materials produced in the US.
Low-income communities or Indian reserves / low-income residential buildings (below 5MW): Additional exemption is set at 1.8GWac/year.

4-1 IRA to Yield Limited Impact to Domestic Energy Storage and PV Industry Chains

- The US will welcome an expeditious growth in demand for energy storage installations under stimulations from the IRA policy. Energy storage batteries will still be imported from Southeast Asia for the short term.

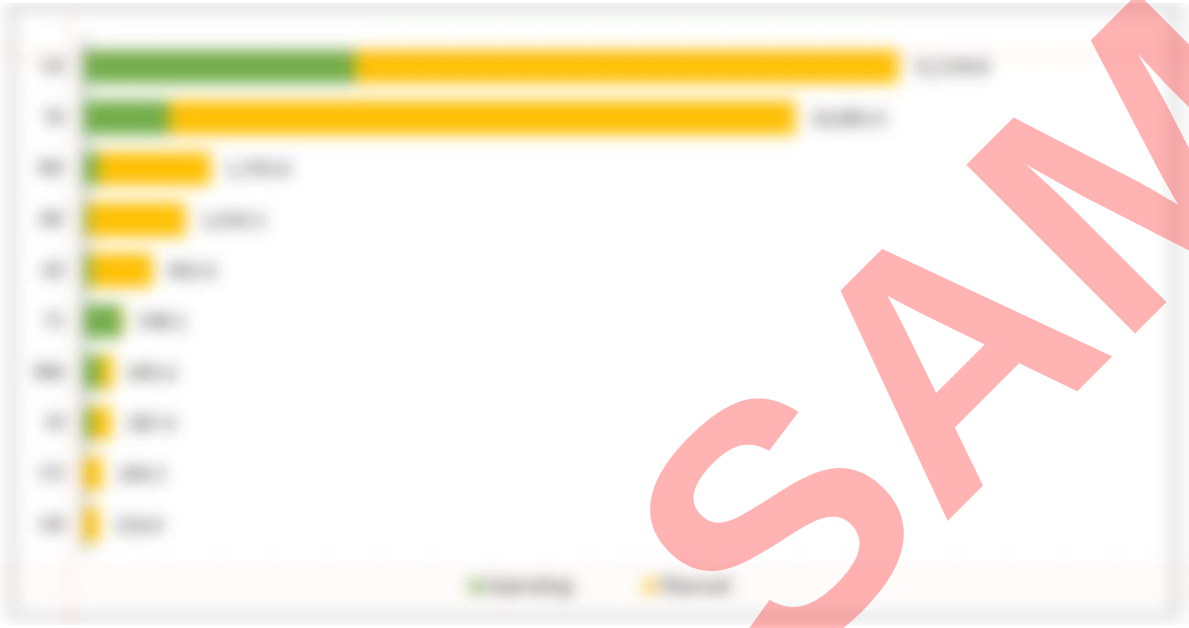
Subsidization for Various Related Segments of Energy Storage

Industry Chain	Segment	Tax Exemption
Battery	Key Mineral	10%
	Active Electrode Material	10%
	Battery Cell	US$35/kWh
	Battery Module	US$10/kWh
	Battery Module (Without Battery Cell)	US$45/kWh
PV Module	Polysilicon	US$3/kg
	Wafer	US$12/$m^2$
	PV Cell	US$4ct/W
	PV Module	US$7ct/W
	Thin-Film Module	US$4ct/W
	Backplane	US$0.4/$m^2$
Inverter	Large Inverter	US$0.25ct/W
	Centralized Inverter	US$1.5ct/W
	Industrial & Commercial Inverter	US$2ct/W
	Residential Inverter	US$6.5ct/W
	Micro Inverter	US$11ct/W

4-1 Two Major Energy Storage Markets: California and Texas Focus on Energy-Based Energy Storage and Power-Based Energy Storage Respectively

- The US is uneven in development of energy storage, which is highly centralized on coastal regions with relatively maturity in renewable energy, such as the West Coast and East Coast.

Grid-Connected Energy Storage Capacity in the US (Unit: MWac)



Grid-Connected Capacity for Distributed Energy Storage Projects in the US (Unit: MWac)

4-1 Impact of California's SGIP2022 on Construction of Local Energy Storage Projects

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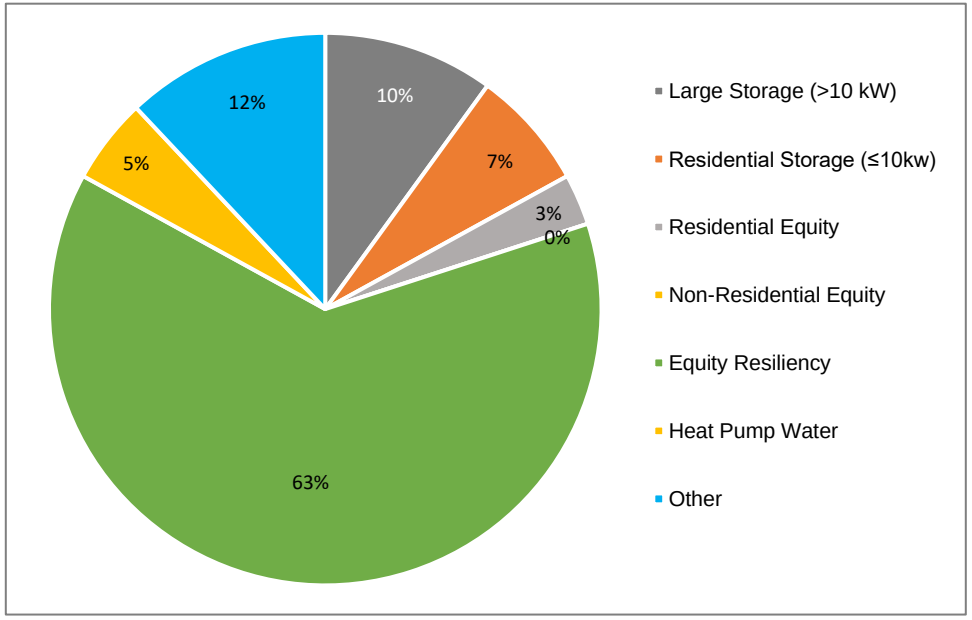
- The Californian government announced the SGIP2022 in April 2022. Subsidization of SGIP2022 is formed with three segments, including general budget, balanced budget, and balanced flexible budget.

Budget on Subsidization for Energy Storage in the California (Unit: US$/Wh)

Type of Budget	Type of Storage	Step 1	Step2	Step 3	step 4	Step 5	Step 6	Step 7
General Budget	Large Storage (>10 kW)	0.50	0.40	0.35	0.30	0.25	-	-
	Large Storage Claiming ITC	0.36	0.29	0.25	0.22	0.18	-	-
	Residential Storage (≤10kw)	0.50	0.40	0.35	0.30	0.25	0.20	0.15
Equity Budget	-	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Equity Resiliency Budget	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Budget Allocation for Subsidization in California (Unit: %)



4-1 Major Differentiation in Implementation Intensity of Renewable Energy Policies among States; Energy Storage Targets Only Seen from 10 States

- State-level renewable energy policies are centralized on the East and West Coasts, and most states in Central and Southern US have yet to establish clear RPS policies.

RPS and CES of Various US States in 2022

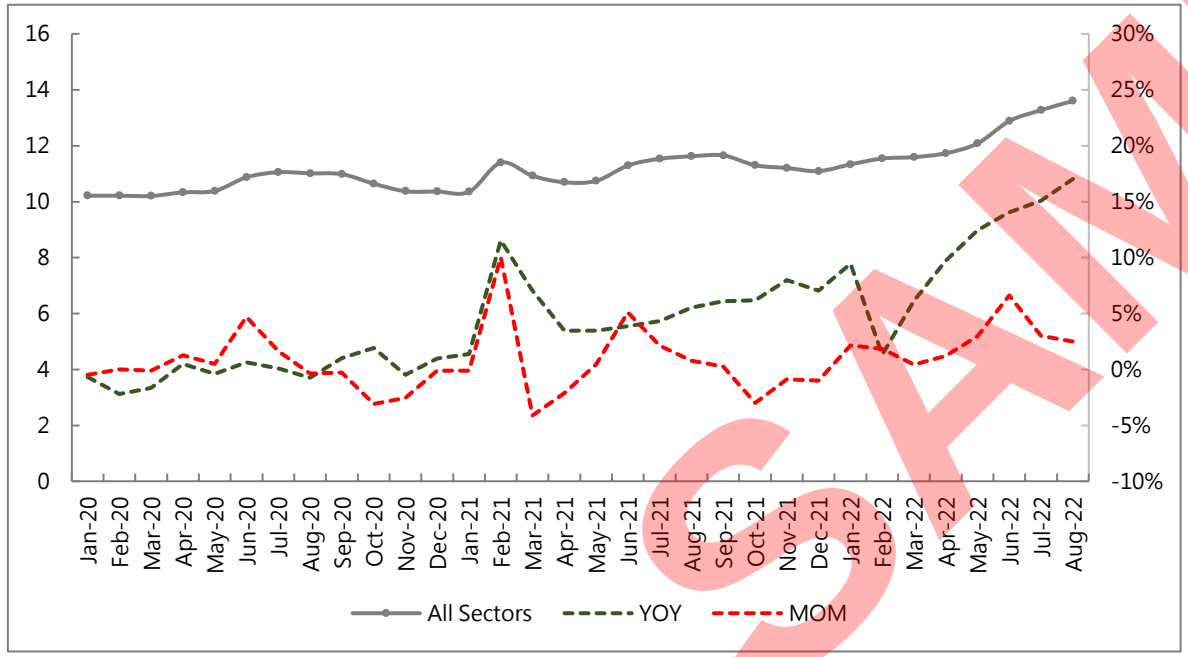
State	Storage Target
California	[illegible]
Connecticut	[illegible]
Maine	[illegible]
Massachusetts	[illegible]
Nevada	[illegible]
New Jersey	[illegible]
New York	[illegible]
Oregon	[illegible]
Virginia	[illegible]
Michigan	[illegible]

Energy Storage Targets of Various States in the US for 2022

4-1 More Than 5GW Major Energy Storage Projects Included in List of Grid Connection in 2022Q3 at an All-Time High

- More than 5GW of major energy storage projects were included in the list of grid connection during 2022Q3 at an all-time high.

Fluctuations of End Electricity Tariffs in the US (Unit: US$ct/kWh)

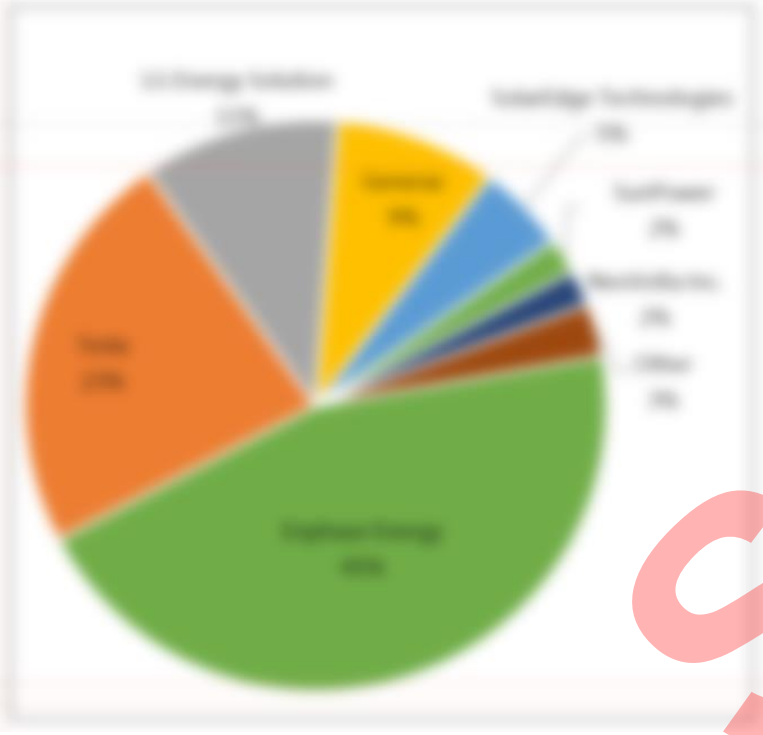


Channels of Grid Connection for Energy Storage in the US (Unit: MWac)

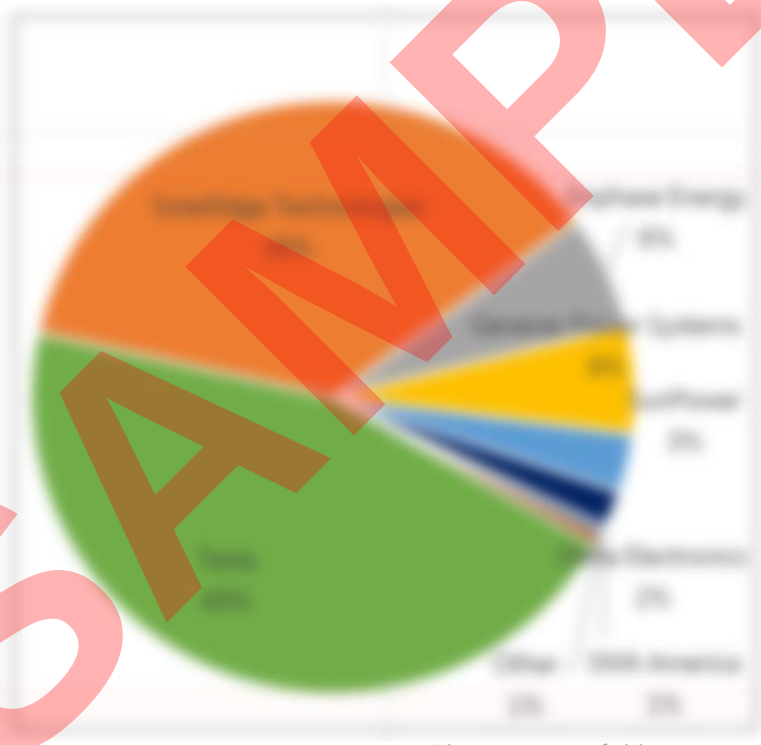
4-1 Residential Energy Storage Focused on Overseas Businesses; Most Domestic Businesses to Participate in Market as OEMs or Upstream Suppliers

- The market of residential energy storage batteries is exhibiting a competitive state of “one super power and multiple great power”, with most leading businesses being overseas integrators.

Market Share of Residential Energy Storage Batteries in the US



Market Share of Residential PV Storage Inverters in the US



Market Share of Residential PV Storage System Installers in the US

4-1 Summary: Future Tendencies and Opportunities of US Energy Storage Market

- Current Demand
- Future Tendencies
- Opportunities/Risks

TrendForce & TRI Research Areas

- IC
- Memory
- Consumer Electronics
- Green Energy
- Display Panel
- Smartphones & Apps
- LED
- Innovative Technology
- Intelligent Living
- Industry 4.0
- Automotive Technology
- AI
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- Gov. & Ent. Consulting Service
- Cloud Computing & IoT

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